Braucht die Welt die Ablation von Lungen-Tumoren?

Jens Ricke

Klinik für Radiologie und Nuklearmedizin

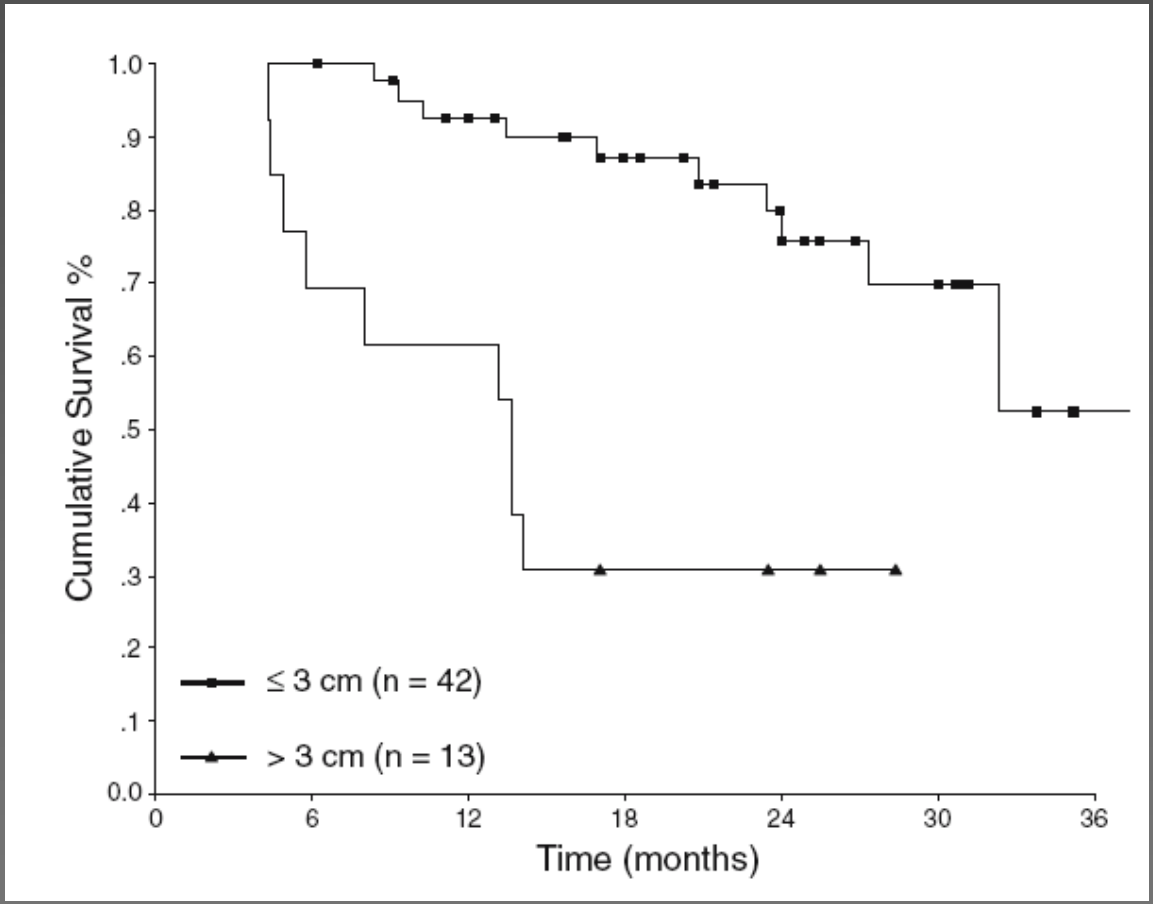
Universitätsklinikum Magdeburg

Schlussfolgerung

- Unzulängliche Technik
- Keine Evidenz

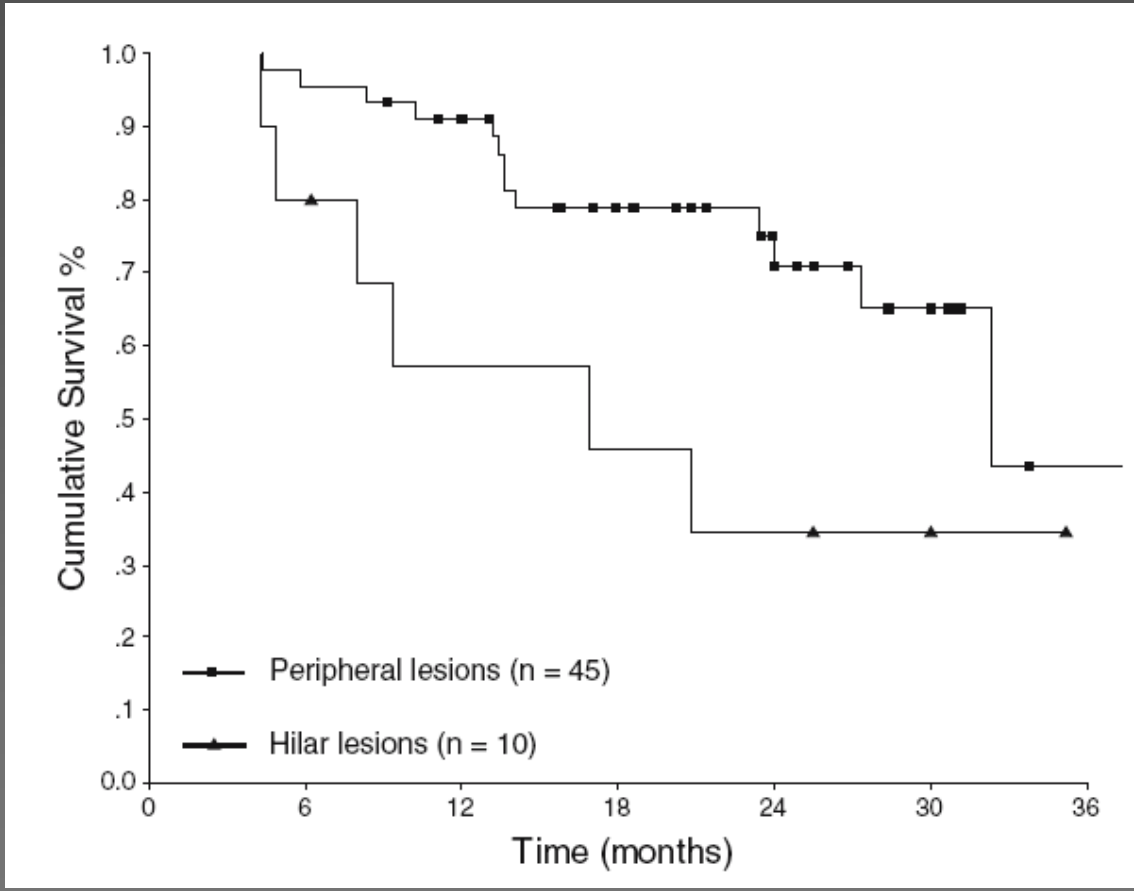
Keine belastbare Begründung für Lungen-RFA

RFA Lunge bei CRC



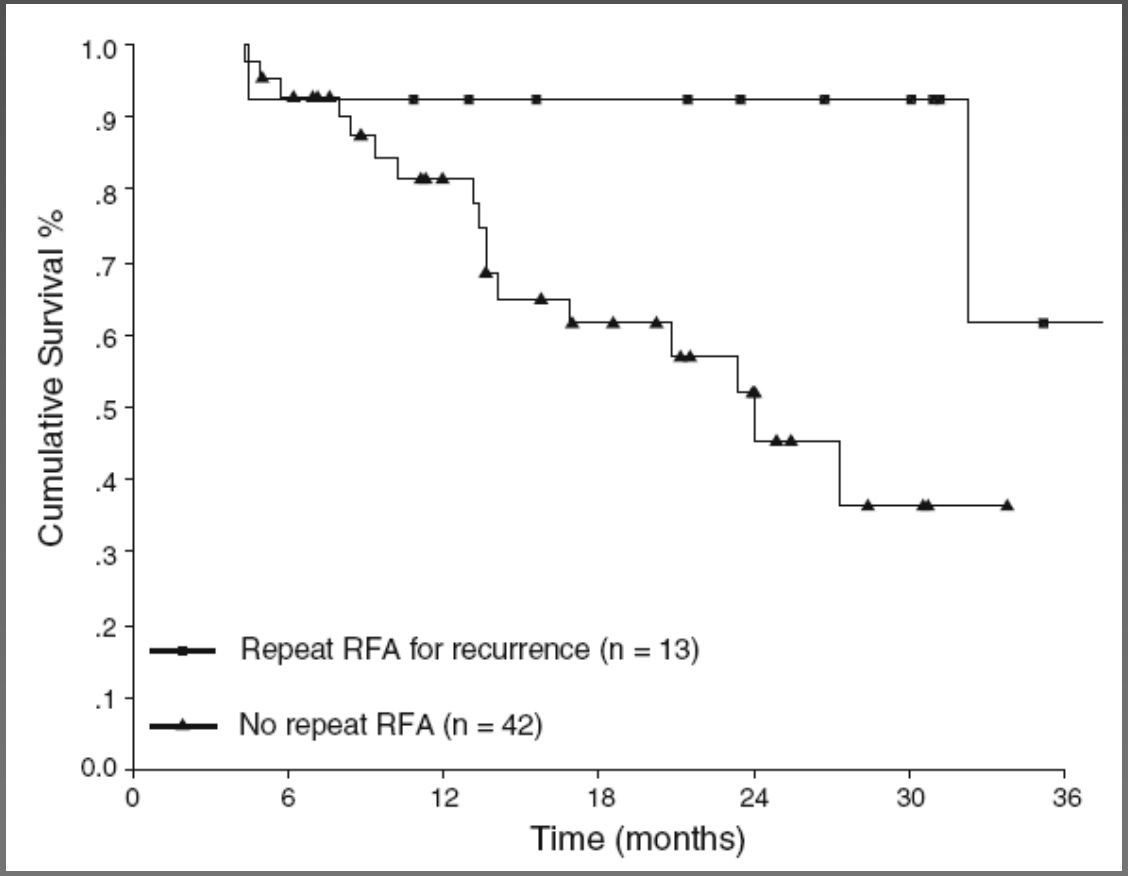
Yan TD Ann Surg Oncol. 2006 Nov;13(11):1529-37

RFA Lunge bei CRC



Yan TD Ann Surg Oncol. 2006 Nov;13(11):1529-37

RFA Lunge bei CRC



Yan TD Ann Surg Oncol. 2006 Nov;13(11):1529-37

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the Journal of Cancer Surgery
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EJSO 37 (2011) 786–790
www.ejso.com

Survival after lung metastasectomy for colorectal cancer: Importance of previous liver metastasis as a prognostic factor

J. Zabaleta [a,*], B. Aguinagalde [a], M.G. Fuentes [a], N. Bazterargui [a], J.M. Izquierdo [a], C.J. Hernández [a], J.M. Enriquez-Navascués [b], J.I. Emparanza [c]

Prognostic factors in CRC

Table 2
Multivariate survival analysis.

	Beta coefficient	Type II error	Level of significance	Hazard ratio
Liver metastasis	0.883	0.414	0.033	2.418 (1.075–5.439)
Age $\geq$ 65 years	0.725	0.402	0.071	2.064 (0.940–4.536)
Pre-thoracotomy CEA	0.572	0.399	0.152	1.772 (0.810–3.875)
Number of metastases	1.442	0.422	0.001	4.227 (1.848–9.669)
$DFI_1 \geq 48$ m	1.161	0.534	0.030	3.194 (1.121–9.102)
Infiltrated lymph nodes	1.165	0.562	0.038	3.206 (1.066–9.644)

DFI_1: Disease-free interval between colectomy and lung metastasectomy.

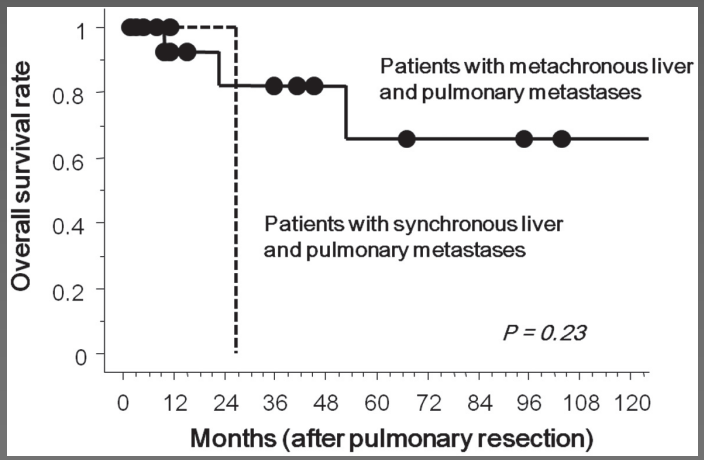
Ann Thorac Cardiovasc Surg 2011; 17: 13–18

doi: 10.5761/atcs.oa.09.01520

Original Article

Lung Metastasectomy for Colorectal Carcinoma in Patients with a History of Hepatic Metastasis

Fengshi Chen, MD, Tsuyoshi Shoji, MD, Hiroaki Sakai, MD, Ryo Miyahara, MD, Toru Bando, MD, Kenichi Okubo, MD, and Hiroshi Date, MD



- n=19; 16 w/ metachronous disease
- 3y survival in metachronous 80%
  - no difference surgery/no surgery
- No long term survival in synchronous disease

Prognostic Factors for Recurrence After Pulmonary Resection of Colorectal Cancer Metastases

Mark W. Onaitis, MD, Rebecca P. Petersen, MD, John C. Haney, MD, Leonard Saltz, MD, Bernard Park, MD, Raja Flores, MD, Nabil Rizk, MD, Manjit S. Bains, MD, Joseph Dycoco, BS, Thomas A. D'Amico, MD, David H. Harpole, MD, Nancy Kemeny, MD, Valerie W. Rusch, MD, and Robert Downey, MD

(Ann Thorac Surg 2009;87:1684–9)

- 378 pts, retrospective, mCRC (lung), lung resection
- Predictor of recurrence:
  - <65y; disease free interval <1y; female; ≥3nodules

→ no thoracic surgery in ≥3nodules and DFI <1y

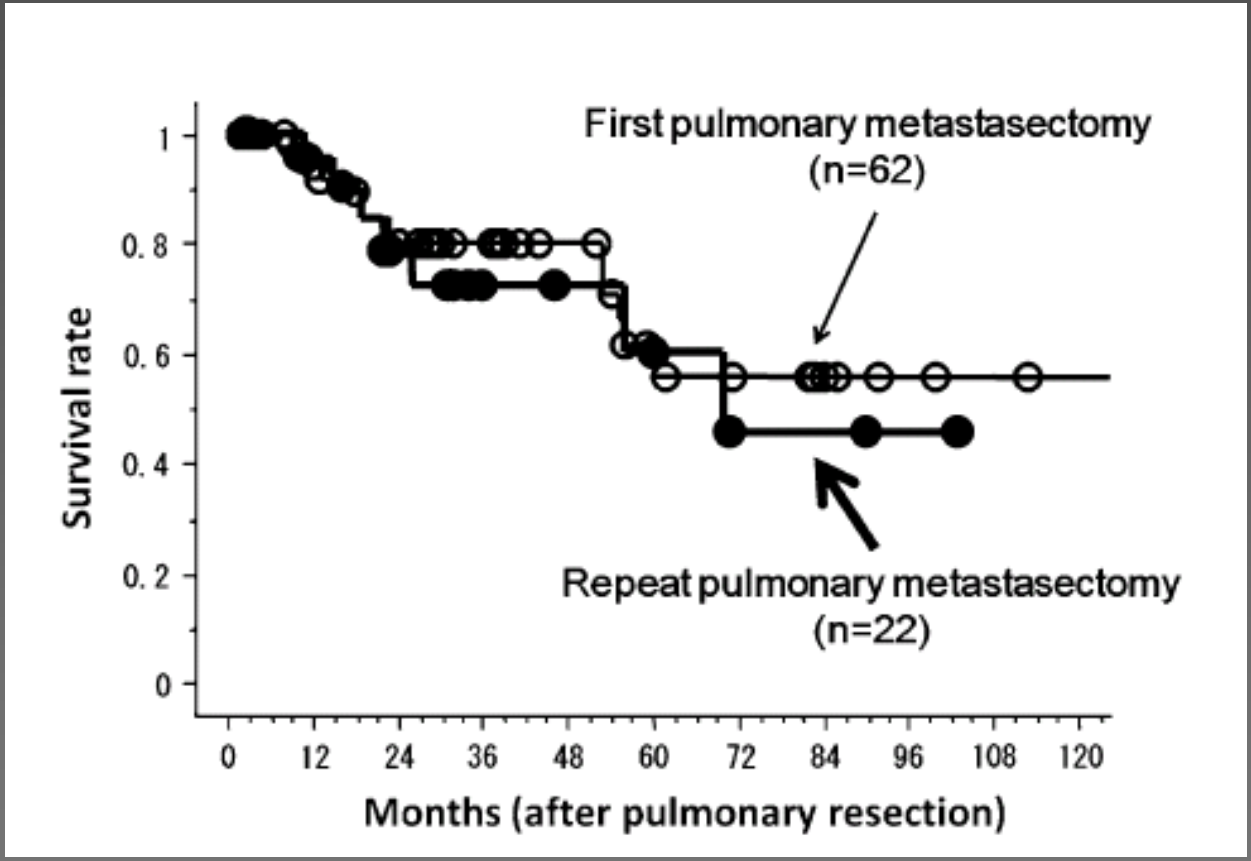
World J Surg (2010) 34:2373–2378
DOI 10.1007/s00268-010-0695-x

World Journal of Surgery

Repeat Resection of Pulmonary Metastasis Is Beneficial for Patients with Colorectal Carcinoma

Fengshi Chen · Hiroaki Sakai · Ryo Miyahara · Toru Bando · Kenichi Okubo · Hiroshi Date

Repeat pulmonary surgery in pulmonary CRC



Solitary pulmonary mets in melanoma

- Retrospective analysis, 122 pts[1]
- Pulmonary resection predictive of survival ($p<0.001$)
  - 40 vs 13 months median survival
- Neg. prognostic factors[1,2]:
  - Short DFI (<1y, 1-5y, >5y)
  - Extrathoracic diease (specifically visceral)
  - >2 metastasis
  - Response to systemic therapy did not influence survival

[1] Neuman, Ann Surg Oncol 2007
[2] Tafra J Thoracic Cardiovasc Surg 1995

World J Surg (2008) 32:2213–2217
DOI 10.1007/s00268-008-9684-8

World Journal of Surgery

Pulmonary Resection for Metastases from Hepatocellular Carcinoma

Fengshi Chen · Kiyoshi Sato · Takuji Fujinaga · Makoto Sonobe · Tsuyoshi Shoji · Hiroaki Sakai · Ryo Miyahara · Toru Bando · Kenichi Okubo · Toshiki Hirata · Hiroshi Date

Prognostic factors in HCC

Variables	No. of patients	OS *P* value	PmFS *P* value
Viral status			
HBV/HCV	9	–	0.75
None	3		
Serum AFP level (ng/ml)			
<100	7	0.97	0.25
≥100	5		
Disease-free interval (yr)			
<1	5	0.17	0.3
≥1	7		
Recurrence of primary ahead of lung metastasis			
Yes	5	0.89	0.63
No	7		
No. of pulmonary metastases			
Solitary	9	0.86	0.11
Two	3		
Largest size of metastases (cm)			
<3	9	0.0006	0.13
≥3	3		

Kontrolliertes Primum; Leberfunktion kompensiert; 5y-OS 28.9%

Available online at www.sciencedirect.com
ScienceDirect
EJSO
the Journal of Cancer Surgery
ELSEVIER
EJSO 35 (2009) 393–397
www.ejso.com

Clinical features of surgical resection for pulmonary metastasis from breast cancer

F. Chen [a], T. Fujinaga [a], K. Sato [a], M. Sonobe [a], T. Shoji [a], H. Sakai [a], R. Miyahara [a], T. Bando [a], K. Okubo [a], T. Hirata [a], M. Toi [b], H. Date [a,*]

[a] *Department of Thoracic Surgery, Kyoto University, Kyoto, Japan*
[b] *Surgery (Breast Surgery), Kyoto University, Kyoto, Japan*

Pulmonary resection in breast cancer

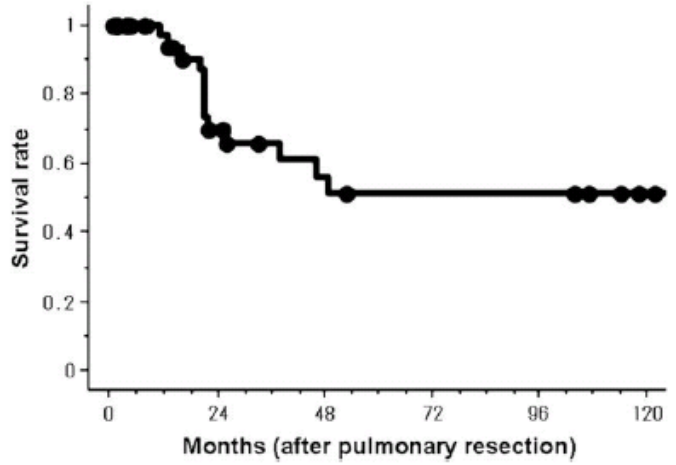
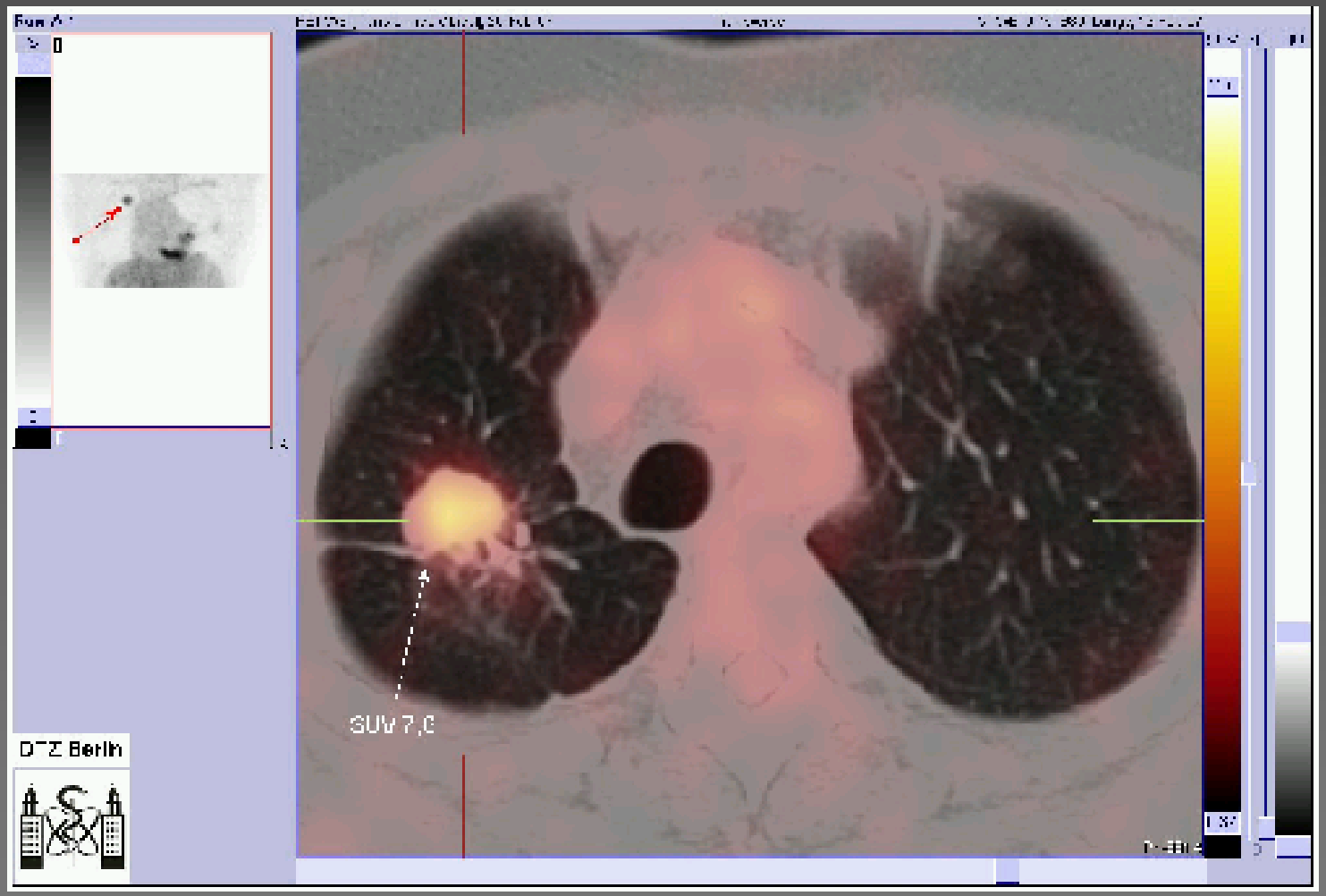


Figure 1. Overall survival of patients following pulmonary resection ($n = 41$).

Table 2B
Multivariate analysis for overall survival

Variables	Hazard ratio	95% confidence interval	*p* value
Number of pulmonary metastases			
(≥4)	6.87	1.31–36.05	0.023
Location of metastases			
(Bilateral)	1.09	0.29–4.04	0.90
Disease-free interval			
(<3 years)	4.11	1.21–14.01	0.024

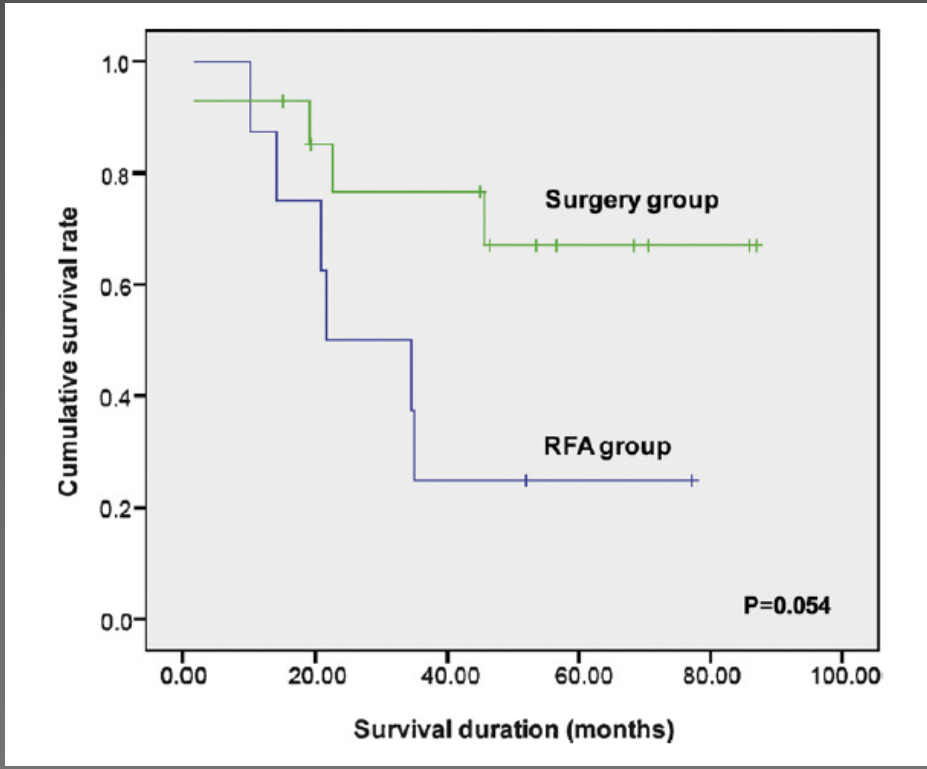
NSCLC stage I



Comparison between surgery and radiofrequency ablation for stage I non-small cell lung cancer

So Ri Kim[a,1], Hyo Jin Han[a,1], Seoung Ju Park[a], Kyung Hoon Min[a], Min Hee Lee[a], Chi Ryang Chung[a], Min Ho Kim[b], Gong Yong Jin[c], Yong Chul Lee[a,*]

- Match pair
- „RFA as good as surgery“
- 8 RFA, 14 surgery
- Comorbidities in RFA group



Eur J Radiol 2012

Cardiovasc Intervent Radiol (2012) 35:343–350
DOI 10.1007/s00270-011-0194-y

CLINICAL INVESTIGATION

Comparison of Survival Rate in Primary Non-Small-Cell Lung Cancer Among Elderly Patients Treated With Radiofrequency Ablation, Surgery, or Chemotherapy

Heon Lee · Gong Yong Jin · Young Min Han · Gyung Ho Chung · Yong Chul Lee · Keun Sang Kwon · David Lynch

- PS 0-2, >60y; n=40 and 36 RFA/surgery
  - RFA: comorbidities
- OS (1) surgery vs (2) RFA
  - stage I to II lung 33.8 and 28.2 months (p = 0.426)
- OS (1) chemotherapy vs. (2) RFA with chemotherapy
  - stage III to IV 29 and 42 months (p = 0.03)

Lee H, CVIR 2012

Interactive CardioVascular and Thoracic Surgery 15 (2012) 258–265
doi:10.1093/icvts/ivs179 Advance Access publication 10 May 2012

Is radiofrequency ablation more effective than stereotactic ablative radiotherapy in patients with early stage medically inoperable non-small cell lung cancer?

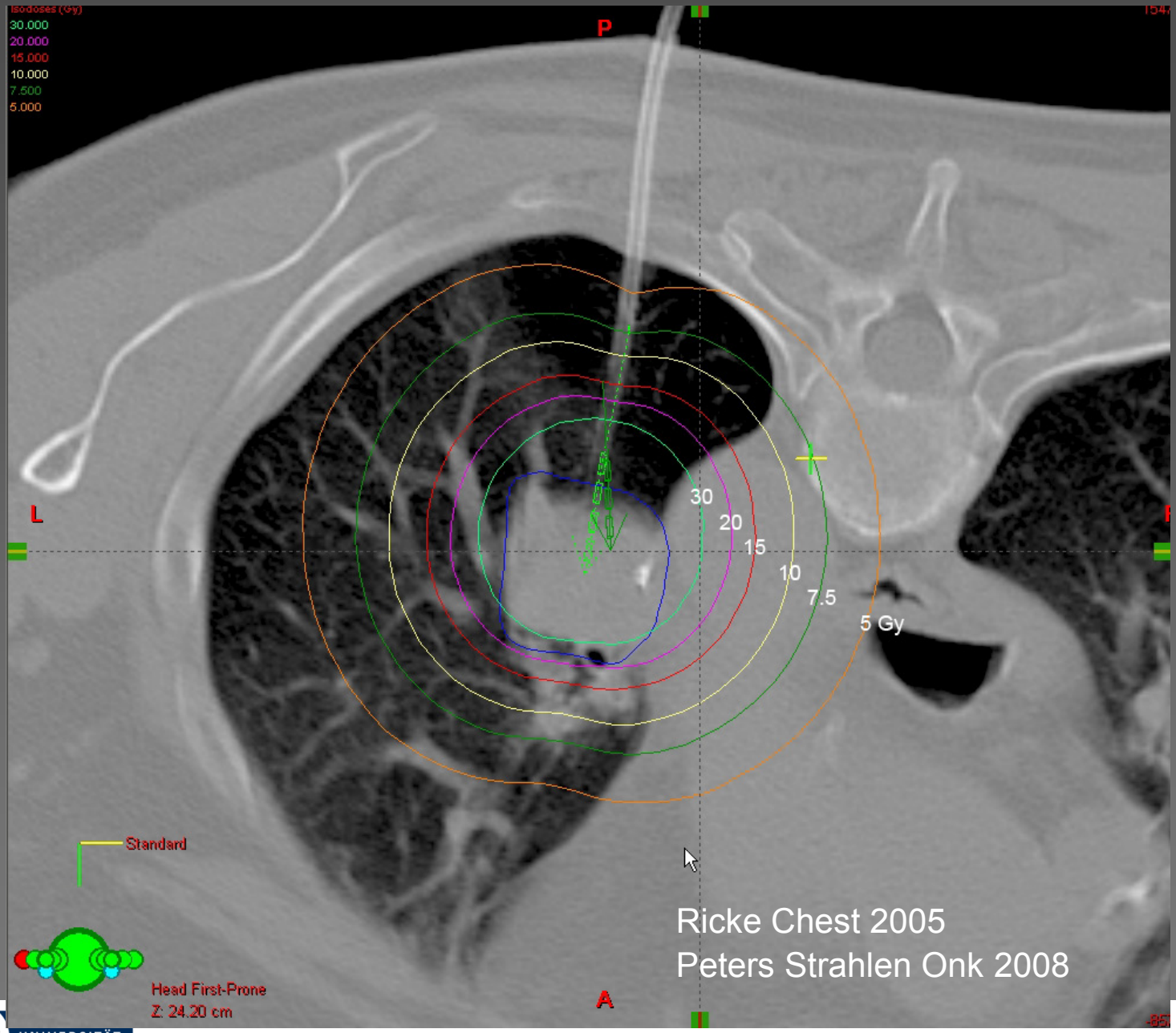
Haris Bilal[a], Sarah Mahmood[b], Bala Rajashanker[c] and Rajesh Shah[a,*]

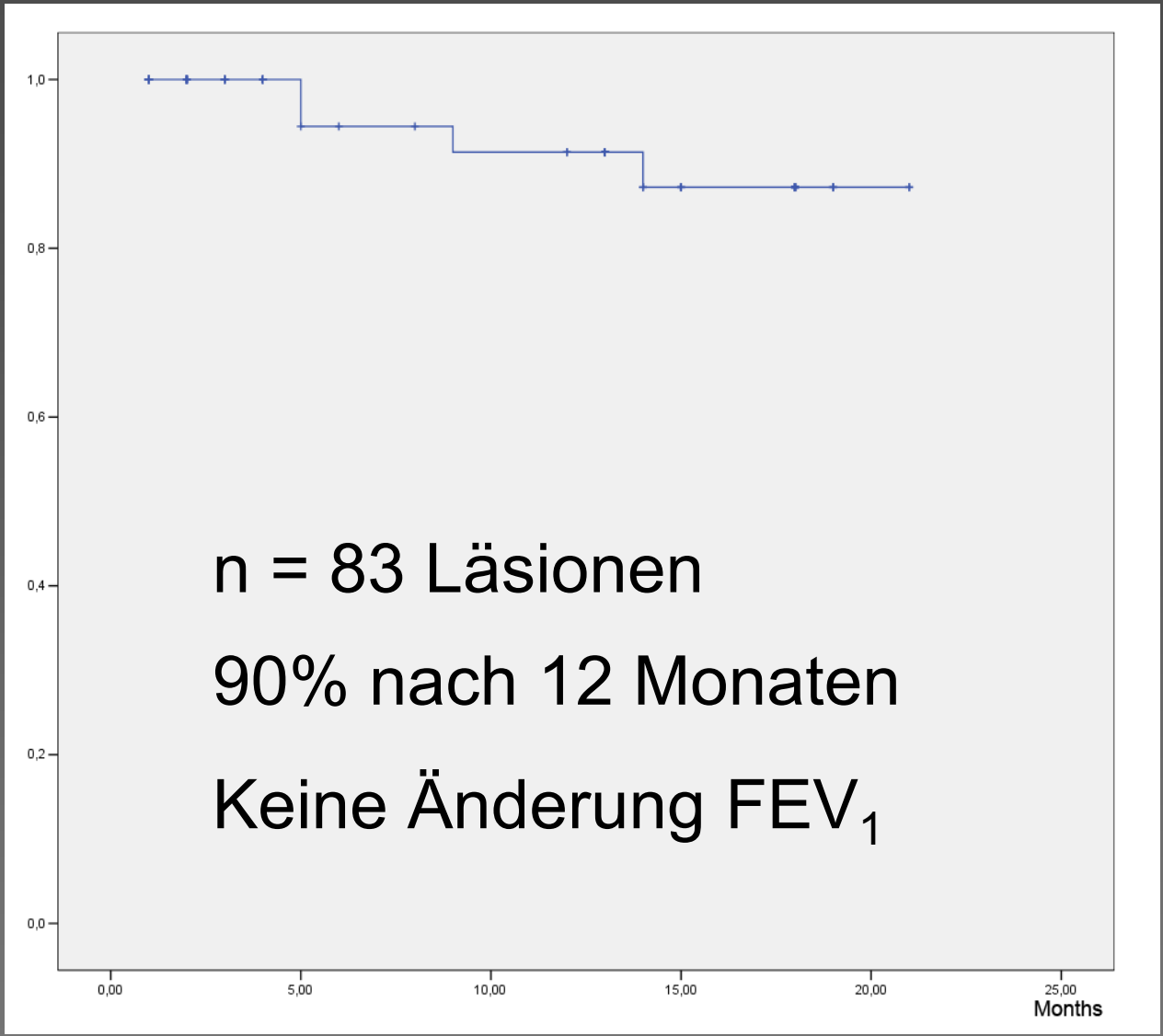
[a] Department of Cardiothoracic Surgery, South Manchester University Hospital, Wythenshawe, UK
[b] University of Liverpool, Liverpool, UK
[c] Department of Radiology, Central Manchester University Hospital, Manchester Royal Infirmary, Manchester, UK

- 16 von 219 Publikationen
- Local progression SBRT 3.5–14.5% vs. RFA 23.7–43%
- Komplikationen:
  - RFA: Pneumothorax (19.1–63%) (Rippenfx 15%?)
  - Fatigue (31–32.6%), pneumonitis (2.1–12.5%), chest wall pain (3.1–12%)

SBRT vs. RFA in NSCLC

- SBRT strong in:
  - central tumours, apical tumours, posteriorly positioned tumours, peripheral tumours
  - Proximity to large vessels
- Increased toxicity of SBRT:
  - Age, tumour size, previous systemic chemotherapy, external beam radiotherapy, emphysema
- RFA can be performed in one session
- Decision must be tailored to individual patients


Isodoses (Gy)
30.000
20.000
15.000
10.000
7.500
5.000
P
L
A
30
20
15
10
7.5
5 Gy
Standard
Head First-Prone
Z: 24.20 cm
Ricke Chest 2005
Peters Strahlen Onk 2008

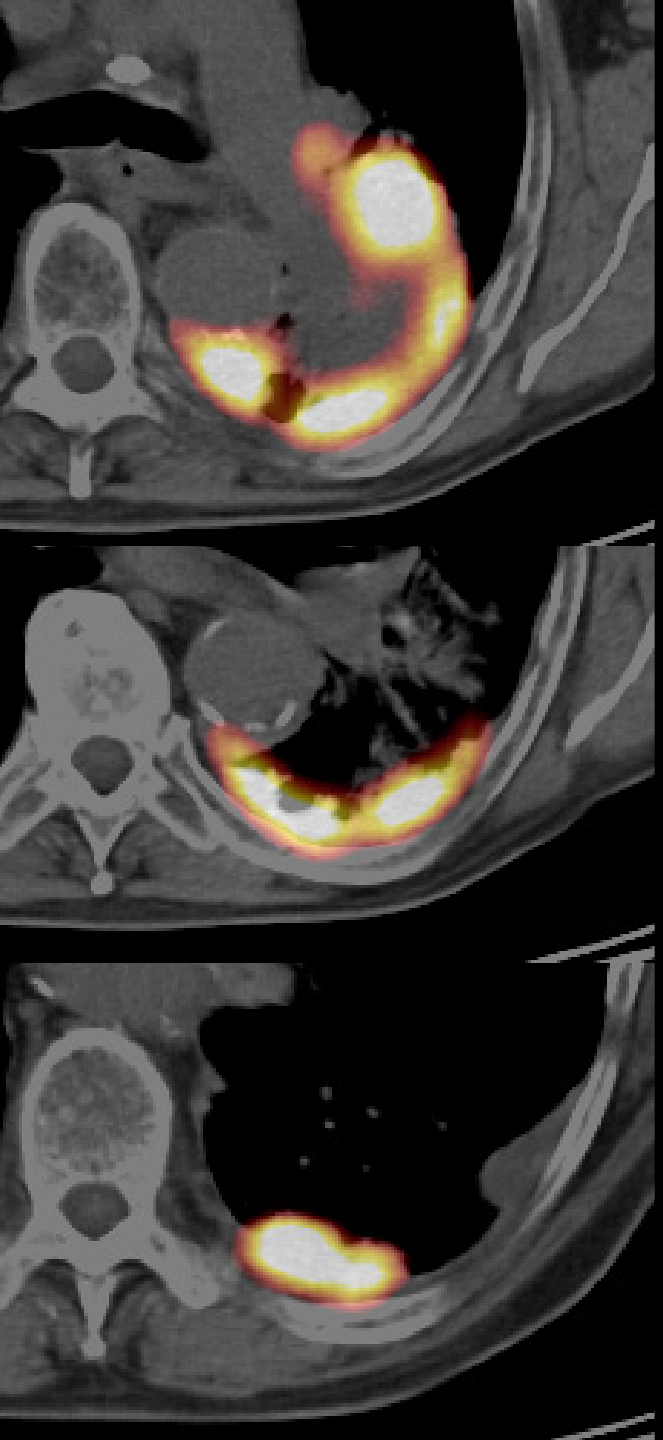


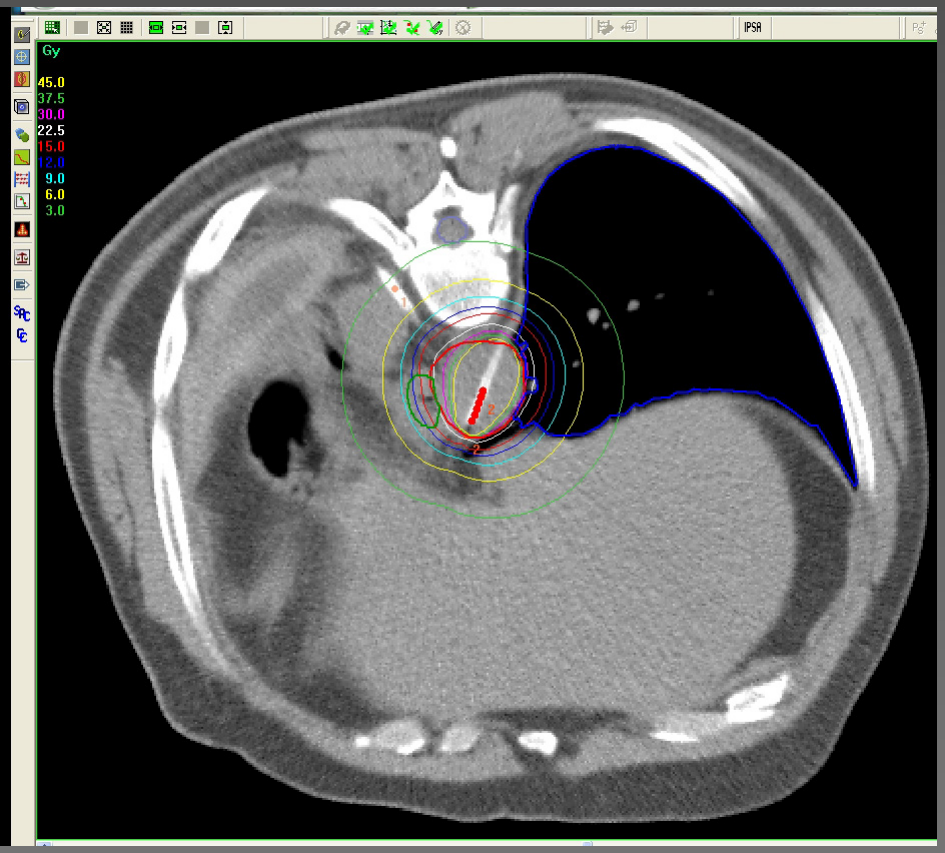
n = 83 Läsionen

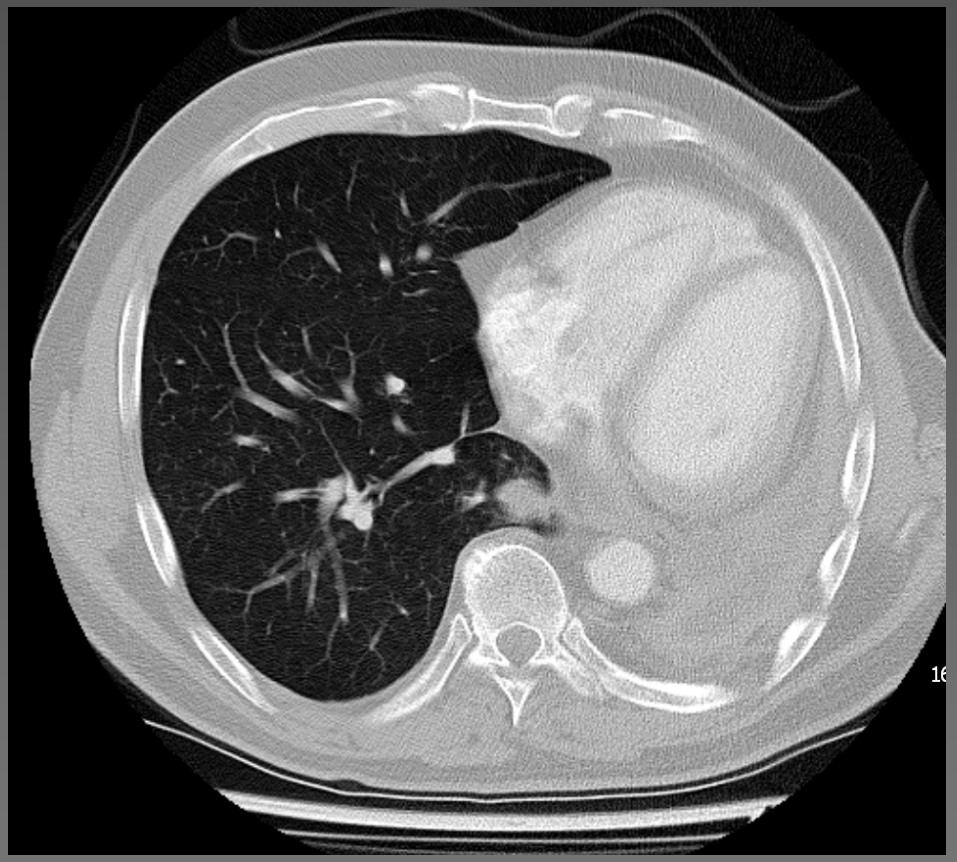
90% nach 12 Monaten

Keine Änderung FEV_1

Peters et al. Strahlen Onkol 2008







12w p.i.

Response to radiofrequency ablation of pulmonary tumours: a prospective, intention-to-treat, multicentre clinical trial (the RAPTURE study)

Riccardo Lencioni, Laura Crocetti, Roberto Cioni, Robert Suh, Derek Glenn, Daniele Regge, Thomas Helmberger, Alice R Gillams, Andrea Frilling, Marcello Ambrogi, Carlo Bartolozzi, Alfredo Mussi

Lancet Oncol 2008; 9: 621–28

	NSCLC (n=24)	CRC metastases (n=44)	Other metastases (n=17)
Confirmed CR*	21	40	14
IR/progression	3	4	3

Numbers are numbers of patients. NSCLC=non-small-cell lung cancer. CRC=colorectal carcinoma. CR=complete response. IR=incomplete response. *Defined as complete ablation of all treated lesions lasting at least 1 year after treatment.

Table 4: Outcome of radiofrequency ablation in 85 patients with malignant lung tumours who were assessed for the primary efficacy endpoint of target tumour response

Local tumor control at 12 months was 88%

Lencioni, Rapture trial, Lancet Oncology 2010

Original Article

Local Progression After Radiofrequency Ablation for Pulmonary Metastases

Erik M. von Meyenfeldt, MD[1]; Warner Prevoo, MD[2]; David Peyrot, MD[2]; Nathalie Lai A Fat, MD[1]; Sjaak J. A. Burgers, MD, PhD[3]; Michel W. Wouters, MD[1]; and Houke M. Klomp, MD, PhD[1]

Cancer August 15, 2011

Table 2. Metastases Characteristics (n = 90)

Characteristic	No. (%)
Size of lesion, median mm [range]	16 [5-80]
<2 cm	62 (69)
2-3 cm	14 (16)
3-5 cm	8 (9)
>5 cm	6 (6)
Location of lesion	
Central	1 (1)
Parenchymal	50 (56)
Pleural	36 (40)
Other	3 (3)
Direct contact with vessels ≥3 mm diameter	26/90 (29)

Radiofrequency ablation 2004-2009; 90 metastases in 65 procedures in 46 patients.

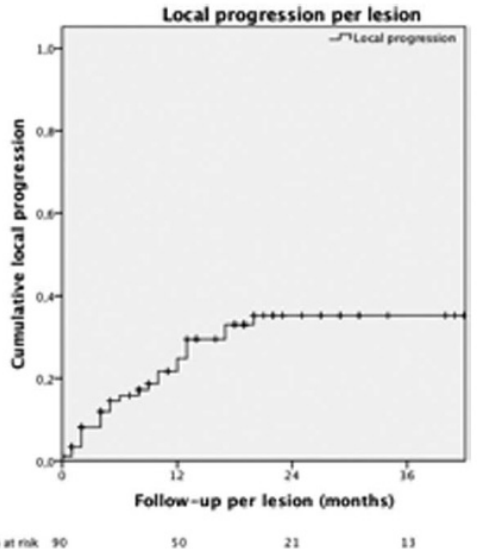


Figure 3. Kaplan-Meier graph depicts local progression of ablated lesions.

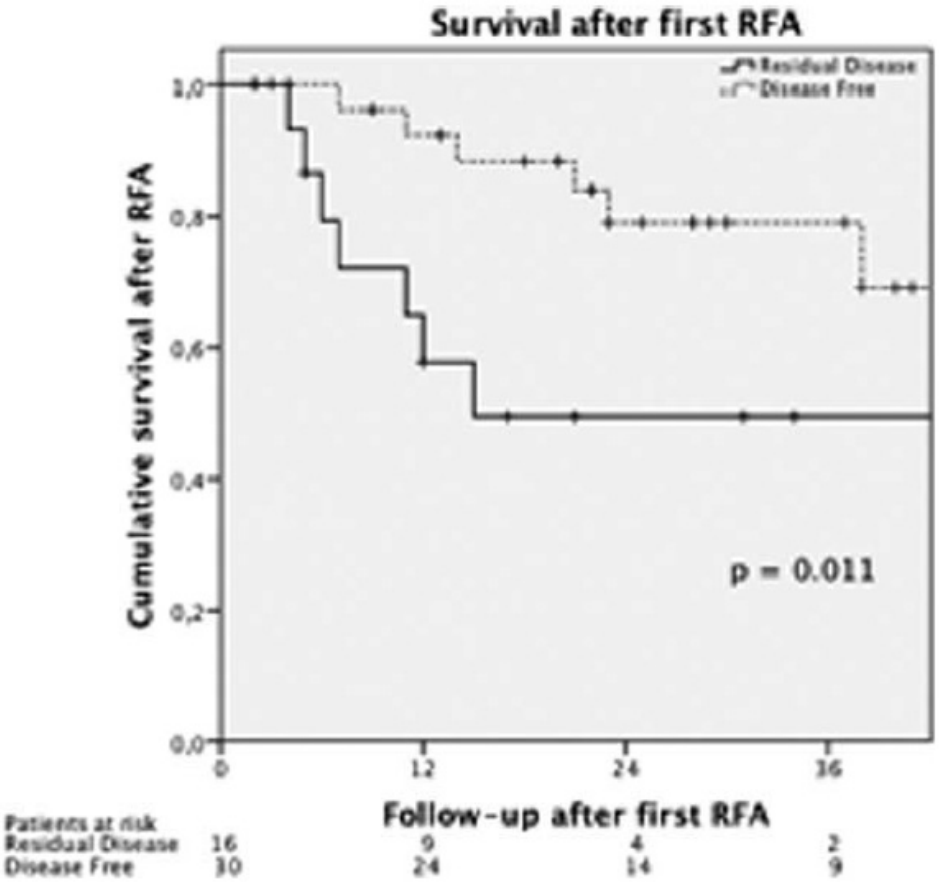


Figure 4. Kaplan-Meier graph depicts survival after the first radiofrequency ablation (RFA) procedure in patients with or without residual lesions ($P = .011$).

von Meyenfeldt, Cancer 2011

Factors Influencing Local Tumor Control in Patients With Neoplastic Pulmonary Nodules Treated With Microwave Ablation: A Risk-Factor Analysis

Thomas J. Vogl[1]
Thomas S. Worst[1]
Nagy N. N. Naguib[1,2]
Hanns Ackermann[1,3]
Tatjana Gruber-Rouh[1]
Nour-Eldin A. Nour-Eldin[1,4]

OBJECTIVE. This study was performed to evaluate risk factors predictive of local tumor control after microwave ablation of primary and secondary lung malignancies up to 3 cm in maximal diameter.

MATERIALS AND METHODS. The single-antenna microwave ablation treatment of 91 index tumors in 57 patients was studied retrospectively. Time to local tumor progression was monitored on CT scans over the follow-up period. Estimation of overall time to local tumor progression was performed with the Cox regression model. Factors hypothesized to cor-

- ≤ 3cm
- FLP*: 67%

TABLE 2: Results of Risk Factor Analysis Before and After Logistic Regression

Factor	Individual Testing Before Regression (*p*)	Independent Correlation After Regression (*p*)
Tumor diameter	< 0.01	
Tumor shape	< 0.01	0.03
Tumor margin definition	0.06	
Pleural adhesion	0.02	
Juxtatumoral vessels	0.08	
Juxtatumoral bronchi	0.89	
Cavernous formations	0.19	
Energy per volume	< 0.001	0.001

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FLP=Freedom from local progression; Vogl AJR 2012

IRE of the lung:

interim analysis of the ALICE trial

University of Magdeburg,

Institute Gustave Roussy Paris

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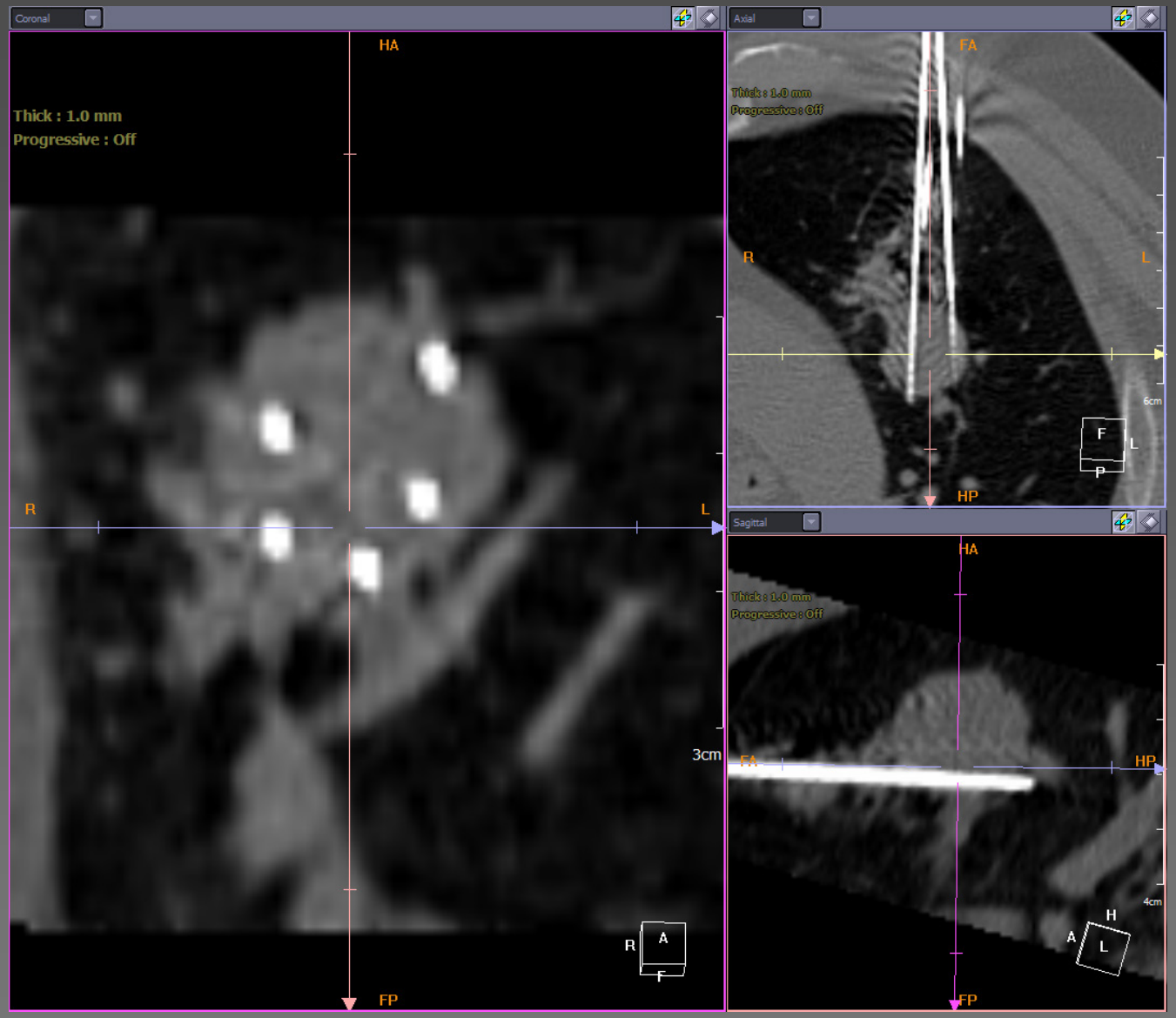
UNIVERSITÄT
MAGDEBURG

Interim analysis

- Paris (IGR), n= 10; Magdeburg, n=13
- 23 patients, 23 lung malignancies
  - NSCLC n=7, metastases n=16
  - 0,7 – 27mm, median 16m
- CT guided, general anesthesia, ECG triggered ablation
- Probes: 2 – 6, median 3
  - Voltage 1500-3000 V/cm
  - 90 pulses, 70 µs duration


Coronal
HA
Thick : 1.0 mm
Progressive : Off
R
L
3cm
R
A
F
FP
Axial
FA
Thick : 1.0 mm
Progressive : Off
R
L
6cm
F
L
P
HP
Sagittal
HA
Thick : 1.0 mm
Progressive : Off
FA
HP
4cm
H
A
L
FP

Safety & Efficacy at 12 months

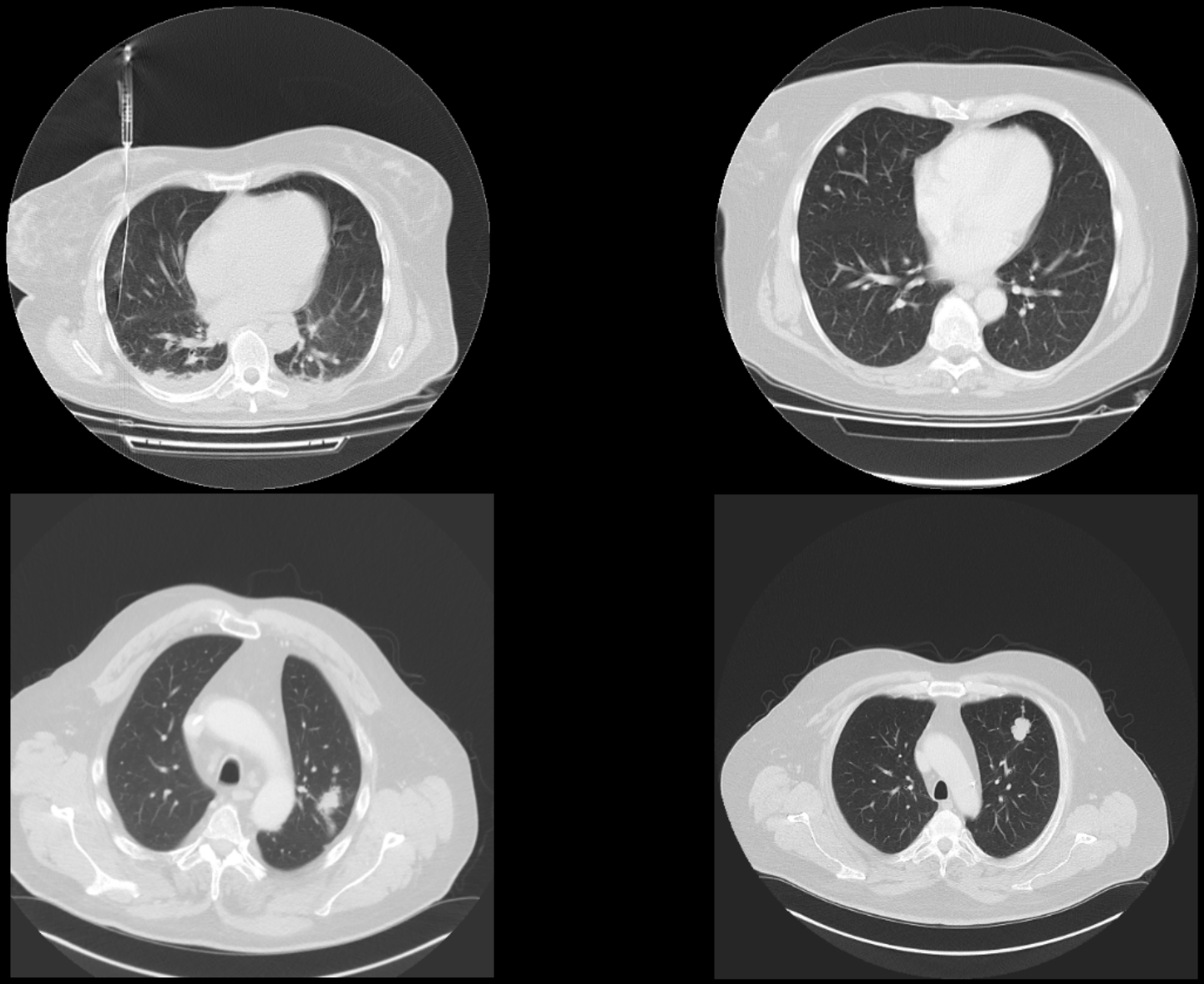
- SAE n=1
  - Chest tube
- AE negligible
  - Pneumothorax rate 50%, minor hemoptysis
- 9 objective response or stable (39%)
- 14 local progression
- 3 patients w/ needle tract seeding
- Trial stopped prematurely

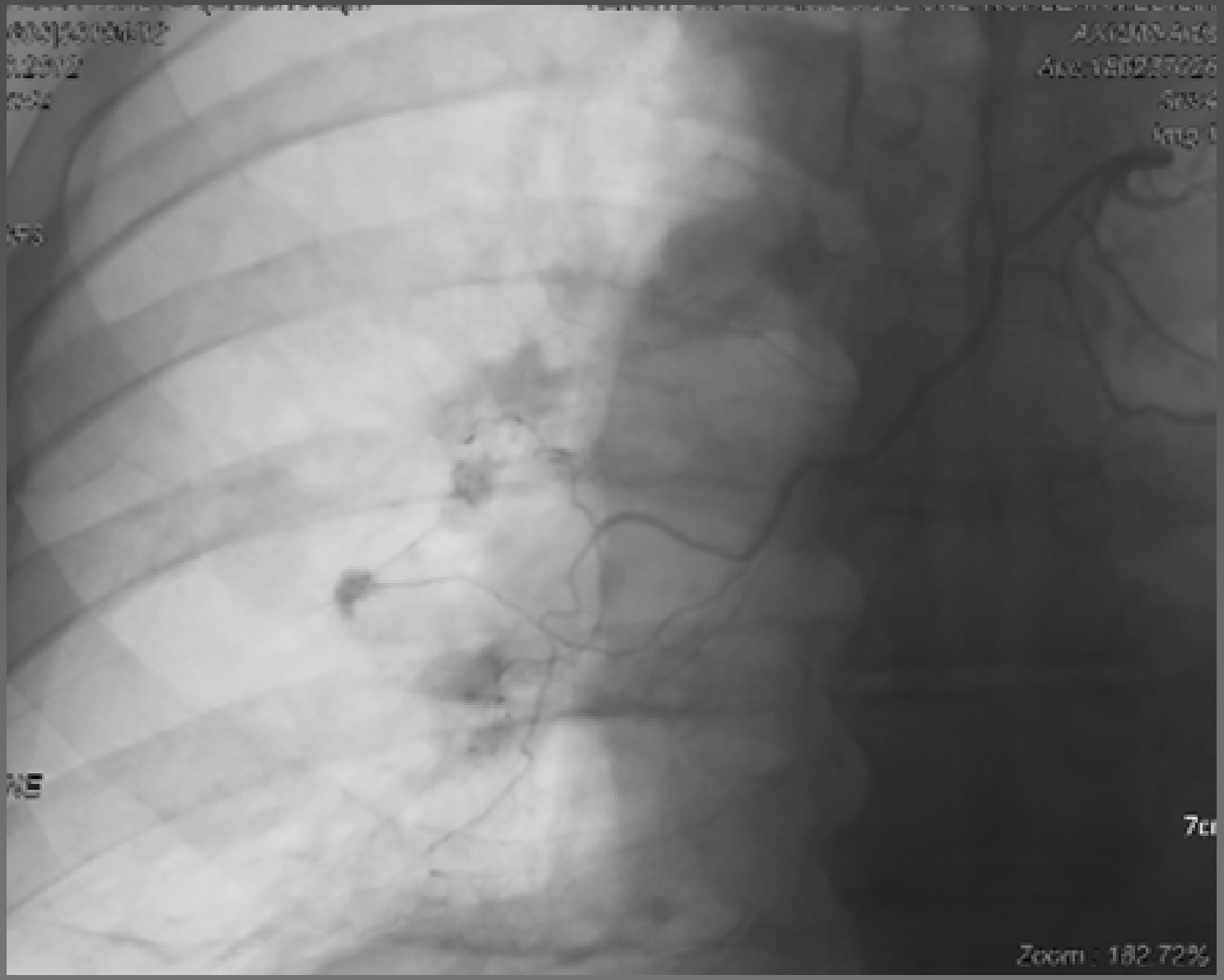
Predictors of local control

Technical parameters

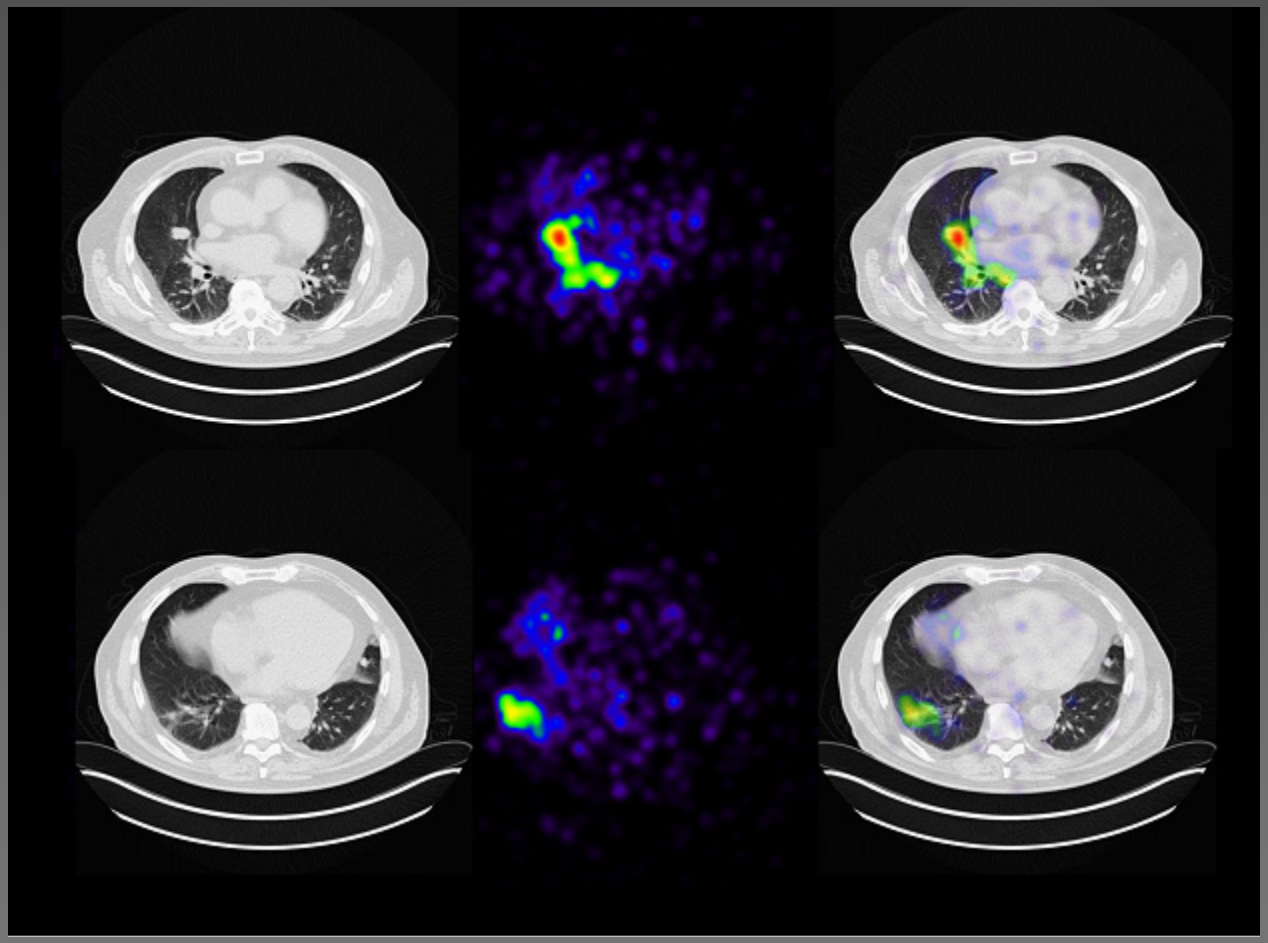
Parameter	Local recurrence (n=14)		No local recurrence (n=9)		p
	Mean	(Min – Max)	Mean	(Min – Max)	
Nr of electrodes	3,00	(2 – 6)	3,11	(2 – 6)	0,829
Ablation pairs	2,64	(1 – 6)	2,89	(1 – 6)	0,877
U_{min} (V)	1866,43	(1000 – 3000)	1741,67	(900 – 3000)	0,439
U_{max} (V)	2694,29	(1800 – 3000)	2477,78	(1800 – 3000)	0,477
$I_{start\ max}$ (A)	25,89	(5,31 – 50,20)	22,09	(9,94 – 43,12)	0,305
$I_{end\ max}$ (A)	32,48	(10,13 – 50,20)	32,44	(14,95 – 50,20)	0,877
$\Delta I_{abs\ max}$ (A)	8,52	(2,20 – 16,50)	12,71	(3,67 – 24,48)	0,201
$\Delta I_{rel\ max}$ (%)	44,57	(18,12 – 90,77)	74,91	(28,75 – 109,83)	$0,028^{sig}$
Pulses per pair	128,81	(70 – 180)	147,78	(90 – 260)	0,439

Needle tract seeding

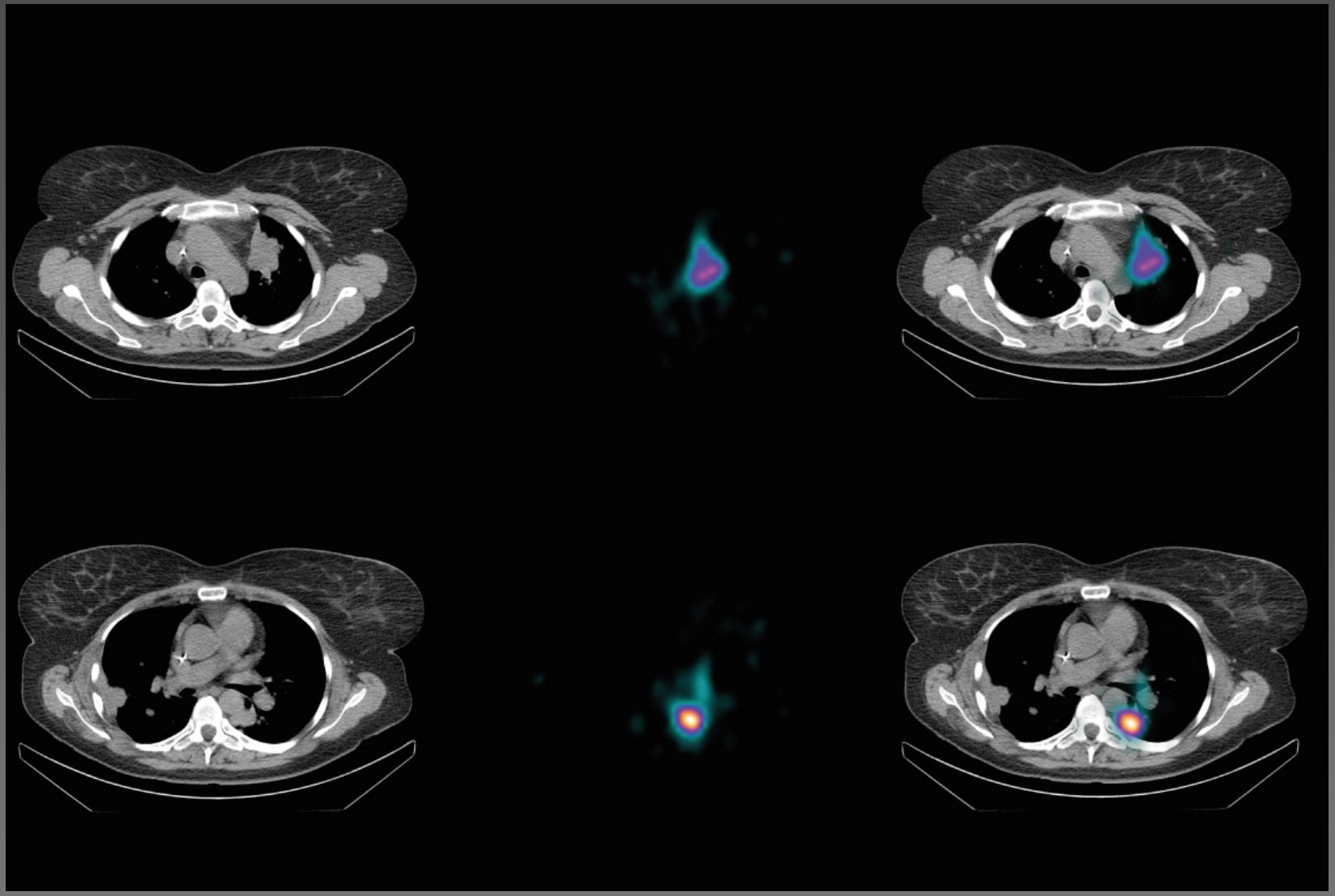




•Ricke CVIR 2013



•Ricke CVIR 2013



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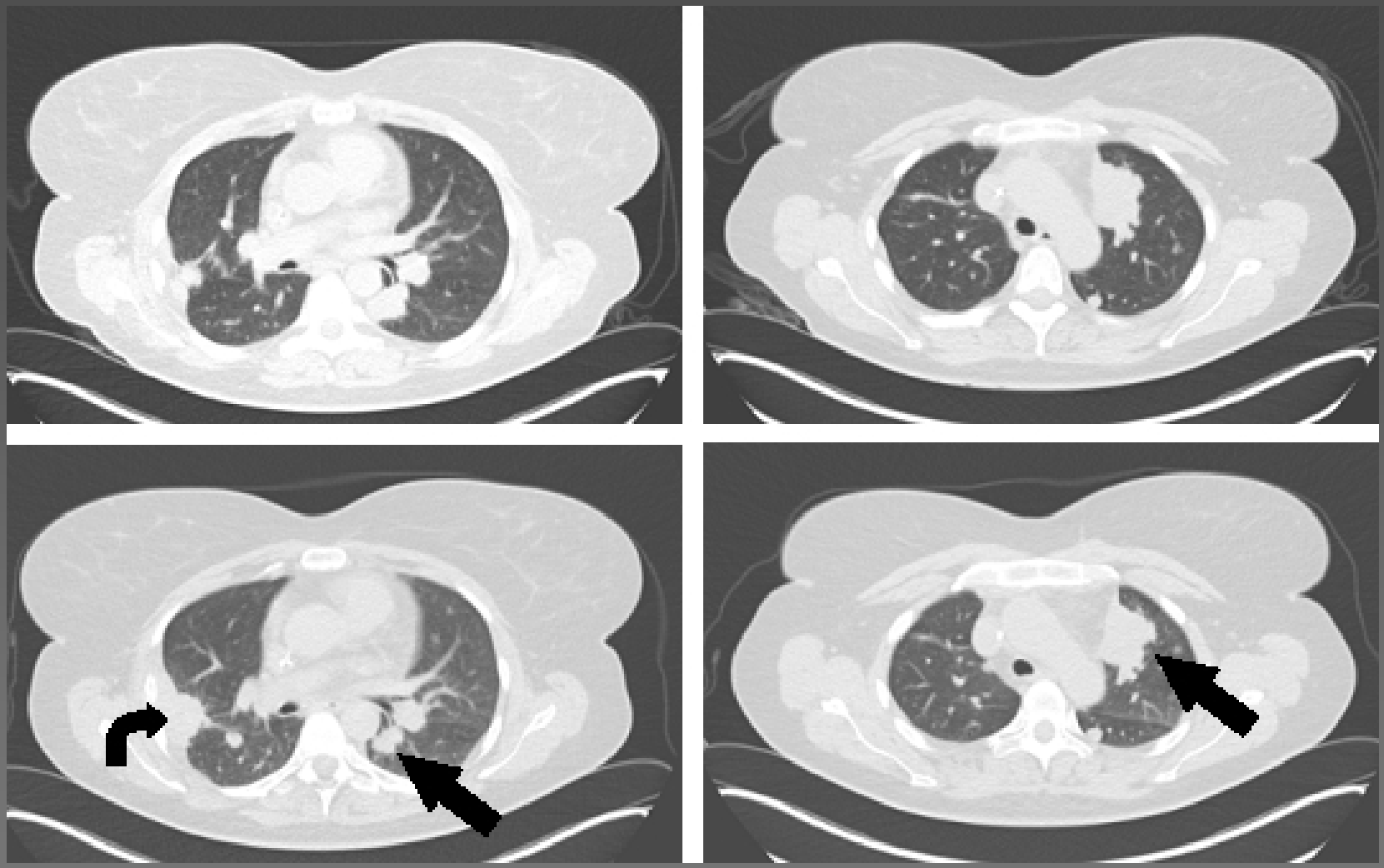

•Ricke CVIR 2013

Take home I

Lokale Ablation in der Lunge benötigt

- Eine bessere Technik
- Eine bessere technische Evaluation
  - MW, IRE, …
- Zitierfähige *echte* klinische Evidenz

Take home II

- Bessere Daten: CRC, Melanom, NSCLC Stage I
  - Performance status
  - Tumorgröße, Anzahl
  - Disease free interval
- Tumorbiologie ist entscheidend

  … aber leider völlig unverstanden

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Englische Website

Aktuelles

Unser letzter Newsletter

Themen

- neuer Mitarbeiter PD Dr. med. Christoph Benckert
- Stand CIRSE 2013 Barcelona
- Erster Brachytherapie-Kurs
- Symposium und Mitgliederversammlung
- neuer AAA-Workshop

Newsletter4.pdf
PDF-Dokument [1.4 MB]

Kursprogramm 2013!
Unsere Broschüre mit unserem kompletten Kursangebot ist fertig! Sie können online lesen oder sich ein Exemplar anfordern, welches wir Ihnen gern per Post zusenden. Dazu bitte einfach ein Email an uns senden: info@dafmt.de

Dritter Newsletter

Herzlich willkommen!

Dafür steht die Deutsche Akademie für Mikrotherapie

- **Exklusive Kursprogramme für minimal-invasive Techniken**
- **Lernen im interdisziplinären Kontext**
- **Hands-on in kleinen Teilnehmergruppen (am Phantom oder Großtiermodell)**
- **Präklinische Forschung mit modernster Ausstattung**

Mittels Mikrotherapie bzw. minimal-invasiver Medizin eröffnet sich eine neue therapeutische Dimension für viele medizinische Disziplinen mit glänzender Perspektive. Aufgrund stetiger technischer Weiterentwicklungen können heutzutage immer mehr Krankheitsbilder mikrotherapeutisch behandelt werden. Dies erfordert aber interdisziplinäre Strategien und eine neue Kultur der Kooperation. Gleiches gilt für die Entwicklung neuer Materialien, Methoden und Werkzeuge, da nur in einer engen Kollaboration mit industriellen Partnern auf die Bedürfnisse der Anwender eingegangen werden kann.

Die Deutsche Akademie für Mikrotherapie möchte eine Plattform für diesen interdisziplinären Dialog bieten. Hauptaufgabe ist die erkrankungszentrierte Lehre von Behandlungsalgorithmen, in die mikrotherapeutische Eingriffe verwoben sind. Hierbei wird besonders Wert auf die praktische Vermittlung der dafür notwendigen Fertigkeiten gelegt.

Sollten wir hiermit Ihr Interesse geweckt haben, dann informieren Sie sich über unser Kursangebot.

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